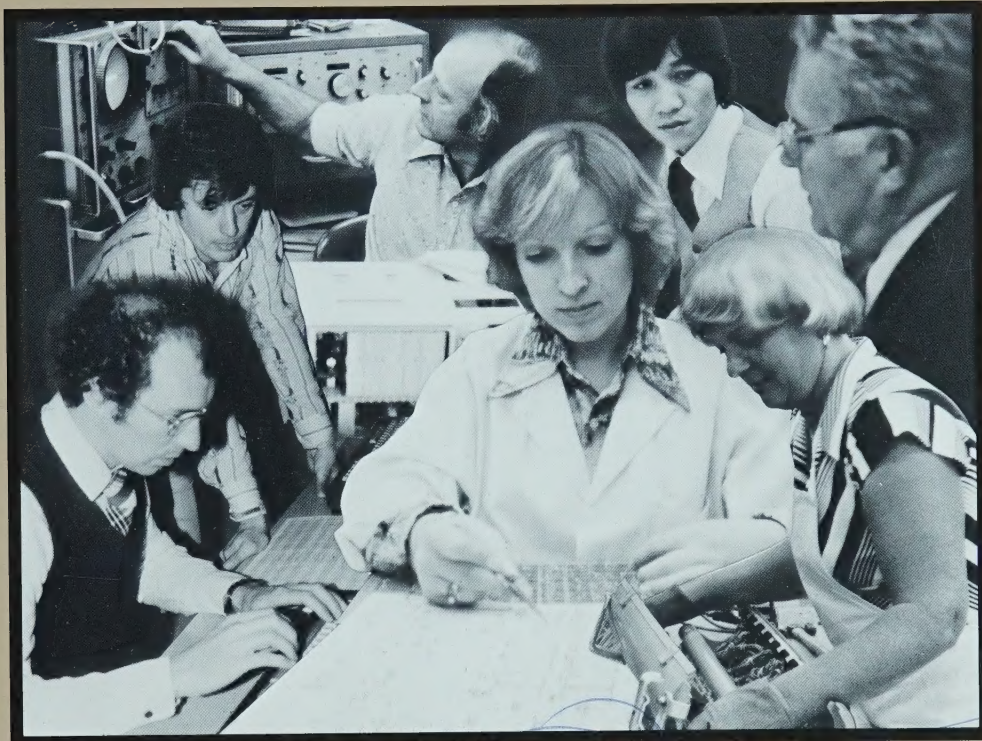


1978 ANNUAL REPORT TO EMPLOYEES

File



nt northern
telecom

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Version française

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Canada L5A 3A2.

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P.O. Box 458, Station A
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ROBERT C. SCRIVENER
Chairman and chief
executive officer
Northern Telecom Limited

In an environment as rapidly changing as the telecommunications and electronics industries, the key to success is innovation: identifying, designing, and producing equipment and services which satisfy real customer needs and keep abreast of market trends. Innovation was aptly described a few months ago by A. Jean de Grandpré, chairman of Bell Canada, as "the act of joining the forces of research and development with manufacturing capacity to put on the market something new, useful and appealing".

People often, and wrongly, think that the process of introducing and maintaining products in the marketplace is the exclusive responsibility of marketing personnel. In the increasingly competitive era in which we now live, marketing effort must be supported by every part of our organization. Every one of our more than 32,500 employees, in each office and every one of the 56 manufacturing plants and six principal research

laboratories we operate in seven countries must be involved in the marketing process. Put another way, every one of our employees can be an innovator.

Though an essential part of innovation is research and development (R&D), it is not enough that we merely dream up ideas for new products or manufacturing processes. First we must accurately identify what our potential or existing clients actually need. We have to know the quantities they are likely to require, when they will want them, and how much they are willing to pay. With this information we can properly decide whether or not it is worth our while to design, manufacture and sell, or in other words, market, a new product or product line.

Even when we have made that decision we have still only begun the process of innovation. Research and development must be closely monitored and efficiently managed. Manufacturing facilities and manpower resources have to be carefully planned, prepared, and put into action. Financing, accounting controls, a properly trained sales force, an efficient delivery system, adver-

EVERY EMPLOYEE IS AN INNOVATOR

The result is that there is an

tising and promotion programs, customer training seminars, a realistic pricing structure and a responsive service organization are all important elements which must be brought into the process.

Add to this myriad of activities the fact that we are always searching for new ways to do things better at a lower cost — so that we can keep up with inflation and beat the competition.

important contribution to make to the innovative process by every one of our executives, managers and employees.

Our corporate-wide commitment to innovation has led to the outstanding technical and market success of such Northern Telecom products as the Contempra telephone and the Digital World of switching and transmission systems — to mention only two examples. By assuming early

leadership in digital technology we have gained access to new markets and managed to protect our position in markets where we are well-established.

The innovative spirit which created and continues to develop the Digital World permeates our organization as we move towards the even more exciting opportunities arising from the convergence of telecommunications and computers. In close cooperation with Bell Canada and Bell-Northern Research, as well as our other research organizations, we have carefully studied the needs, timing and characteristics of this new trend. Having been a significant contributor to it since its beginning, we were in a position to set long-term strategies and identify product categories which will form an Intelligent Universe of worldwide electronic communications systems. Electronic data transmission equipment, private communications networks, and electronic office systems and products are the first and largest components of the Intelligent Universe which is being born from the marriage of computer and telecommunications technologies.

The basis of our strategy for the Intelligent Universe is outlined in more detail in the 1978



POISED FOR THE 1980s

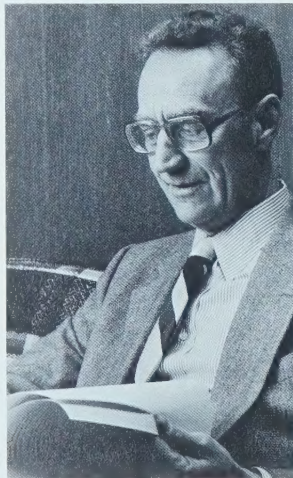
annual report to shareholders. By intensive research and development programs and by acquisitions, we are participating in many of the new opportunities created by this technological phenomenon.

If we are to succeed in the attainment of our goals, each manager and employee, regardless of the kind of job he or she is doing, must feel a genuine enthusiasm to help put and keep new high-quality, price-competitive products in the marketplace. As you read through the articles of this report I hope you will share with me the conviction that if every single one of us considers the needs of our new and traditional customers as a top personal priority, we will all benefit from the rewards of true innovation. ■

WALTER F. LIGHT
President
Northern Telecom Limited

We successfully overcame a number of problems in 1978 and took important steps to further prepare ourselves for new opportunities in the 1980s.

Our biggest challenges were created by poor economic conditions, especially in Canada, and by increased competition. Most of our traditional competitors have stepped up their competitiveness. In addition, large, well-established electronics firms and computer companies are taking



advantage of the fact that their products have the same basic technology as ours: large-scale integrated circuits and software.

Fortunately, we have been expecting these challenges for some time and have developed products and strategies to meet them.

We are the only company in the world with a firm public commitment to manufacture a complete family of digital switching and transmission systems. Through careful planning and determination we have managed to bring the Digital World, announced in 1976, to the market a full year ahead of schedule.

New market conditions and new technology have had a significant impact on our workforce. We are relying more heavily on highly trained specialists, often called knowledge workers, in all areas of our operations. At the same time, we depend on skilled production workers in plants around the world to produce reliable, high-quality equipment on or ahead of the schedules to which we are committed.

In 1978 our sales in the U.S. continued to increase at a faster rate than our sales in Canada.

U.S. sales rose from 19 to 28 percent of our telecommunications manufacturing sales and to 32 percent of total manufacturing sales.

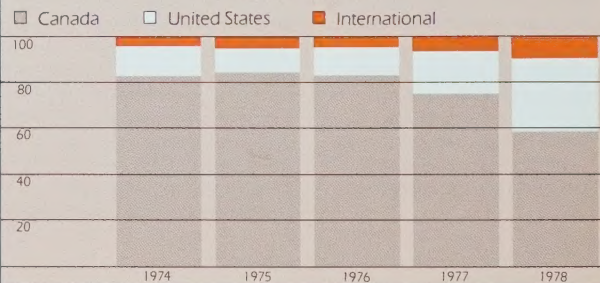
The drop in percentage of Canadian sales, from 76 percent of telecommunications manufacturing in 1977 to 67 percent in 1978 was due largely to the fact that telephone company purchases of telecommunications equipment did not keep up with inflation. In spite of this we have kept our share of the Canadian market. Investments in better machinery, improved production methods, low levels of lost-time accidents and other factors are paying off. Increased efficiency and productivity help maintain the 1,600 manufacturing jobs in Canada which are created by exports to Turkey,

Ireland, the United States and other parts of the world.

In 1978 Northern Telecom, Inc. continued to grow in the U.S. telecommunications market. NTI's successful production and marketing of the DMS-10, for instance, has made the DMS-10 the most successful digital central office switch in North America. Equally important to our growth in the U.S. and elsewhere is the SL-1 business communications system which we sell to private users. We shipped twice as many SL-1s in 1978 as in 1977. The tandem switches and CBXs produced by Danray, acquired in 1978, give us further strength in penetrating new markets. The Cook Electric division had another outstanding year following major gains in 1977.

Total manufacturing revenues by geographic area

(percent at point of sale)



The acquisition in 1978 of Spectron, Inc. will add to NTI's reputation as a leading manufacturer of transmission test equipment.

The other half of our business in the United States, electronic office systems, got underway in 1978 with the acquisition of Data 100 and Sycor, the two manufacturers of computer terminal systems which form the nucleus of Northern Telecom Systems Corporation. NTSC will direct the design, manufacturing and marketing of electronic office systems around the world.

Progress in North America in 1978 was matched in importance by gains made by Northern Telecom International in other parts of the world. The sale of an SL-10 data packet switching sys-

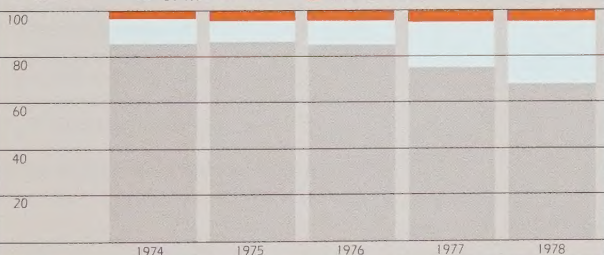
tem to the Deutsche Bundespost, West Germany's telecommunications authority, illustrates the respect our digital products are gaining in Europe. Orders for DMS-1s, DMS-10s and DMS-100s in Barbados, Jamaica and the Bahamas further demonstrate strong international demand for our digital products.

Our successes everywhere stem from our proven ability to identify and design products which respond to market trends. One of every nine Northern Telecom employees works on product research and development or on manufacturing improvement programs. In 1978 we invested \$97.8 million on R&D. We expect to quadruple the level of investment in the next decade.

Telecommunications sales by geographic area

(percent at point of sale)

□ Canada □ United States ■ International



Our long-term strategy to design, produce, and market complete information systems, first for offices and eventually for homes of the future, will account for our major growth in the 1980s. Towards this end we will continue to adapt our organization to changing conditions.

In 1978 Basil A. Beneteau was appointed president and chief executive officer of Northern Telecom Canada. Charles G. Millar, now executive vice-president, operations, is responsible for Northern Telecom's world-wide manufacturing operations. Leonard N. Mackenzie, president

and chief executive officer of Northern Telecom Systems Corporation, joins us from TRW Communications Systems and Services at Los Angeles, California, where he was vice-president and general manager. John C. Lobb, formerly our chairman and chief executive officer, became the first chairman of Northern Telecom Systems. He retired in April, 1979.

These appointments and other organizational changes will better position us to face the challenges of today and to prepare for new opportunities in the future. ■

In 1978 Northern Telecom signed an agreement with the Barbados Telephone Company to supply DMS equipment for its telecommunications network. Left to right: Don Hill, managing director, Barbados Telephone, Jean-Paul Gagnon, president, Northern Telecom (CALA) Corp., and Walter Light.

HOW WE DID IN 1978

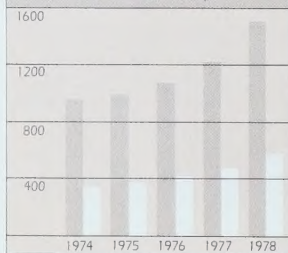
Revenues and Earnings

Total revenues in 1978 were \$1.505 billion, up 23.2 percent from sales of \$1.222 billion in 1977. Net earnings were \$100.7 million, compared with \$85.3 million in 1977. Wages and salaries (including costs of benefits) paid to employees in 1978 were \$576.2 million, up 26 percent from the \$458.1 million earned by employees in 1977. Dividends paid to shareholders were \$21.3 million in 1978 compared with \$17.5 million in 1977.

Total revenues and total compensation

(\$ millions)

□ Revenues □ Compensation



Markets and operating subsidiaries

Our telecommunications manufacturing sales outside Canada in 1978 were higher than in previous years. About 67.3 percent of 1978 telecommunications manufacturing sales were in Canada, 27.5 percent in the U.S. and 5.2 percent in other international markets. In 1977 the telecommunications sales pattern was 75.7 percent in Canada, 18.9 percent in the U.S. and 9 percent in other areas of the world.

The highest increase in telecommunications sales was in the U.S., where sales were up by 52 percent over 1977. Northern Telecom, Inc. and its Cook Electric division both showed strong growth.

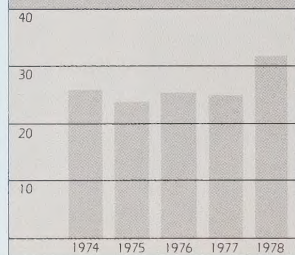
Despite continued poor economic conditions in Canada, Northern Telecom Canada maintained its market share in all the markets available to it. This was mainly the result of a company-wide productivity improvement program.

Sales increased in the areas served by Northern Telecom International: Europe, Asia, the Caribbean, Latin America and the Middle East. Exports accounted for 1,600 manufacturing jobs in Canada. This was nearly 11 percent of the workforce of Northern Telecom Canada.

Northern Telecom Systems Corporation, formed in 1978 to manage our worldwide electronic office equipment business contributed \$171.5 million to 1978 revenues.

Number of employees

(thousands)



Research and Development

Northern Telecom spent \$97.8 million on research and development last year, 43.4 percent more than the \$68.2 million spent in 1977. In the last 10 years we have invested almost \$468 million on R&D for new products and improved manufacturing methods. In 1978 about 3,600 people, one of nine Northern Telecom employees, were involved in product research and development or improvement of

manufacturing methods. Almost 40 percent of our Canadian R&D was done by Northern Telecom Canada.

Products

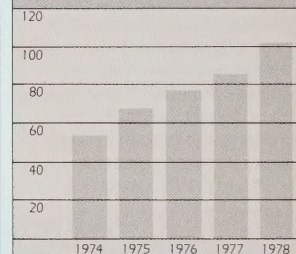
Sales of Northern Telecom's new digital switching and transmission systems increased substantially in 1978. By year-end we had sold or firm commitments for almost 800 SL-1 business communications systems. Of these about 490 are in the United States, 230 are in Canada, and 75 are overseas. We now have SL-1 customers in 18 countries.

Sales, orders and shipments of DMS digital switching and transmission systems continued to climb in 1978. By year-end Northern Telecom had sold, or had orders or firm commitments for about 550 DMS systems. The first commercial DMS-200 long-distance switching system was shipped in April, 1978. The first DMS-100 local switching system and the first DMS-300 international gateway switching system were shipped in December. At the end of the year there were 183 installations of the DMS-1 digital remote carrier system. We had 186 DMS-10 small central office switching systems sold or on order, of which 80 percent were for the U.S. market.

Other product highlights in 1978 include the first international sale of an SL-10 digital packet switching system, the market introduction of Northern Telecom's electronic telephone, and the addition of new models to the Imagination line of telephone sets. ■

Net earnings

(\$ millions)



WHERE THE MONEY GOES

Our customers bought \$1.5 billion of goods and services from us in 1978, a new record amount.

As in the past, the largest portion of these sales dollars went to our suppliers and to us as employees.

Out of every dollar we made, we paid 43.9 cents, or a total of \$663 million, to other companies for materials, supplies and services we need to make and sell our products and run our business.

Our suppliers sold us everything from raw materials, such as the sheet metal and chemicals that go into our products, to the extrusion and inserting machines needed to make the products. They sold us the computers, word processors and pens, pencils and paper we needed to keep track of our production and supply our customers.

You and I, as employees, received the next largest share of the income: 38.1 cents out of every sales dollar received by the company went to pay our salaries, wages and benefits.

These benefits included the company's contribution on behalf of employees for workmen's compensation, pension funds, and hospital, medical and other insurance plans the company supports. As employees, we earned \$576 million — a new record level of wages and salaries and benefits, 26 percent higher than last year's \$458 million.

Governments at all levels — federal, state, provincial and municipal — took their share of our sales income. Our taxes amounted to \$116 million or 7.7 cents on each sales dollar received.

We received more in interest from our investments and cash in the bank than we paid out this year. Because our net interest showed a positive balance of about \$6.6 million, we have not included net interest as a slice of our dollar.

We also set aside \$55.1 million, or 3.6 cents per sales dollar, to allow for the wear-and-tear on our buildings, machinery and equipment.

What remained out of the original \$1.5 billion was \$100.7 million or only 6.7 cents of each sales dollar. This was the company's net earnings or profits after taxes. Out of these earnings we paid \$21.3 million — 74 cents per share — to our shareholders as dividends on their investments. We retained nearly 80 percent of our earnings, \$79.4 million, to reinvest in the business on new plant and equipment to help keep us competitive in the future. ■

How each sales dollar was spent

Other companies for materials, goods and services	43.9 cents
Employees, for wages, salaries and benefit plans	38.1 cents
Governments, to pay federal, provincial, state and municipal taxes*	7.7 cents
Depreciation, to provide for wear-and-tear on plants and equipment	3.6 cents
Dividends to shareholders, for the use of their money	1.4 cents
Retained in the business for future needs	5.3 cents
	100.0 cents

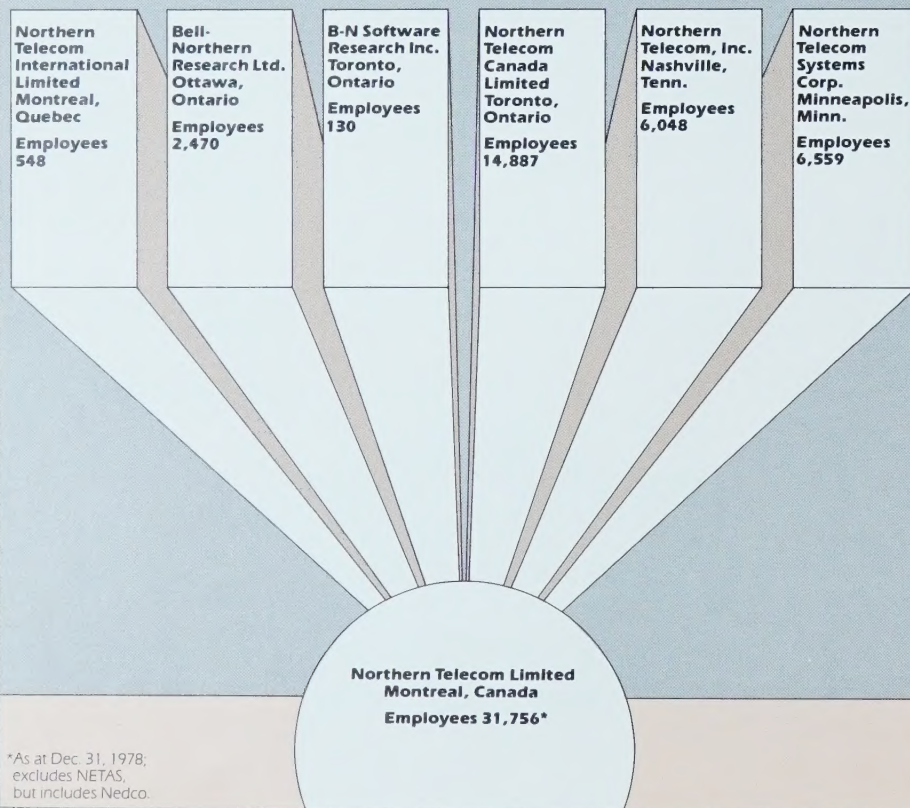
How we spent one and a half billion dollars

To other companies for materials, goods and services	\$ 663,440,000
To employees for wages, salaries and benefits	576,173,000
To governments for taxes*	115,669,000
Depreciation, to provide for wear-and-tear on plants and equipment	55,102,000
Net interest on loans (surplus)	(6,552,000)
To shareholders as dividends, for use of their money	21,337,000
Retained in the business for future needs	79,391,000
	\$1,504,560,000

*excludes provincial sales tax



NORTHERN TELECOM LIMITED AND PRINCIPAL SUBSIDIARIES



*As at Dec. 31, 1978;
excludes NETAS,
but includes Nedco.

Northern Telecom Limited
Chairman of the Board and
Chief Executive Officer
Robert C. Scrivener

President
Walter F. Light

Executive vice-presidents
Donald A. Chisholm
Technology

Charles G. Millar
Operations

James G. Stark
Finance and planning

W. A. Thompson
Administration

Vice-presidents
Clive V. Allen
General counsel

Walter C. Bengier
Market development

Roy T. Cottier
Corporate relations

J. D. M. Davies
Business development

Robert A. Ferchat
Controller and treasurer

Ronald A. Hunter
Operations planning

Palle Kiar
Customer development

John D. MacDonald
Technology management

Edward B. Matthews
Business systems

Donald A. Noble
Human resources

John A. Roth
Operations, manufacturing

Lloyd A. Taylor
Semiconductor components

Secretary
John T. Burnett

Bell-Northern Research Ltd.
Chairman of the Board
Donald A. Chisholm

**President and
Chief Executive Officer**
C. Denis Hall

Vice-presidents
L. Colin Beaumont
Digital switching systems
development

John Elliott
Transmission and data

Harvey S. Goodwin
Administration

Robert Kenedi
Systems

Eugene B. Lotochinski
International

Lloyd A. Taylor
Technology

Treasurer and controller
Frank T. Chaikowsky

Secretary and legal counsel
Roger W. Hacker

BNR Inc.
President
John S. Buchan

Vice-presidents
C. William Dougherty
Administration and treasurer

Eugene J. Swystun
Development

Peter G. Turner
Systems

Secretary
Roger W. Hacker

OFFICERS AND SENIOR MANAGEMENT

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President
John H. Aitchison

Vice-presidents
James G. Reddy
Finance and administration

C. David Sadleir
Development

Secretary
Peter J. Knowlton

NETAS — Northern Electric Telekomünikasyon A.S.

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and Managing Director**
Robert R. Watt

General secretary
Iskender N. Taner

**Northern Telecom A.G.
Managing Director**
Hugh A. Hamilton

**Northern Telecom (Asia) Limited
Managing Director**
Mendel C. Cohen

**Deputy Managing Director
and controller**
Brian A. Robson

**Northern Telecom (CALA)
Corporation
President and
General Manager**
Jean-Paul Gagnon

**Northern Telecom Canada
Limited
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Switching

Kenneth H. Woodley
Subscriber equipment

Senior vice-presidents

William J. Pardy
Administration
H. Lloyd Webster
Marketing and technology

Vice-presidents
Clare A. Anderson
Western Canada
J. J. André Boutin
Cable and outside plant

John W. Caffry
Controller and treasurer

Robert M. Cuddy
Manufacturing

Richard A. Fortier
Personnel and
industrial relations

Roy Merrills
Staff, subscriber equipment

Elliot Turcot
Advanced switching systems

David G. Vice
Transmission

D. Wynn Walters
Public relations

**Northern Telecom, Inc.
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Chief Executive Officer**
Monson H. Hayes, Jr.

Group vice-presidents
Charles J. Graham
Products

Kenneth H. Woodley
Business communications

Thomas R. Worthy
Telco

Corporate vice-presidents

William C. Cawthron
Operations
Jerry L. Kreiger
Human resources

Eugene B. Lotochinski
Technology
John MacDonald
Finance and treasurer

Richard R. Standel, Jr.
General counsel and secretary

Division presidents
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Cook Electric

James L. Donald
Danray

Richard W. Lindsay
Advanced telephone products

A. Burney Lipscomb
Business communications

James Palmer
Spectron

Clifton W. Sink
Marketing
Kenneth E. Tingley
Northeast Electronics

Jack A. Vincent
Digital switching

Staff vice-presidents
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Product line management, office

Herbert L. Hughes
Telco sales

David C. Perdue
Advanced planning, BCG

Thomas J. Watson
National accounts, AT&T

Charles M. Young
National accounts

Controller
David C. Cairns

**Northern Telecom
Industries Sdn. Bhd.
Managing Director**
Ho Boon Theam

**Northern Telecom
International Limited
President and
Chief Executive Officer**
William T. Simpson

Vice-president
Jean-Paul Gagnon

Secretary
John T. Burnett

**Northern Telecom
(Ireland) Limited
Chairman of the Board**
Lord Killanin

Managing Director
Hugh A. Hamilton

**Northern Telecom
(Middle East) Ltd.
Managing Director**
Brian Baynes

**Northern Telecom Systems
Corporation**

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administration

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Controller

K. Dieter Heidrich
International marketing

Richard R. Standel
General counsel and secretary

Melvin E. Stever
Marketing

Staff vice-presidents
Herbert S. Amster
Treasurer

John S. Cain
Marketing controller

Richard J. Casterline
Product-line management

Duane S. Carlson
Operations controller

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Field engineering

Anthony L. Fazio
Sales

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International marketing development

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Manufacturing

Floyd M. Hartwig
Engineering

Thomas G. Herschbach
Staff manufacturing

Raymond P. Kavlick
Advanced technology

Donald J. Pate
Distributor sales

Steven D. Riedel
Product marketing

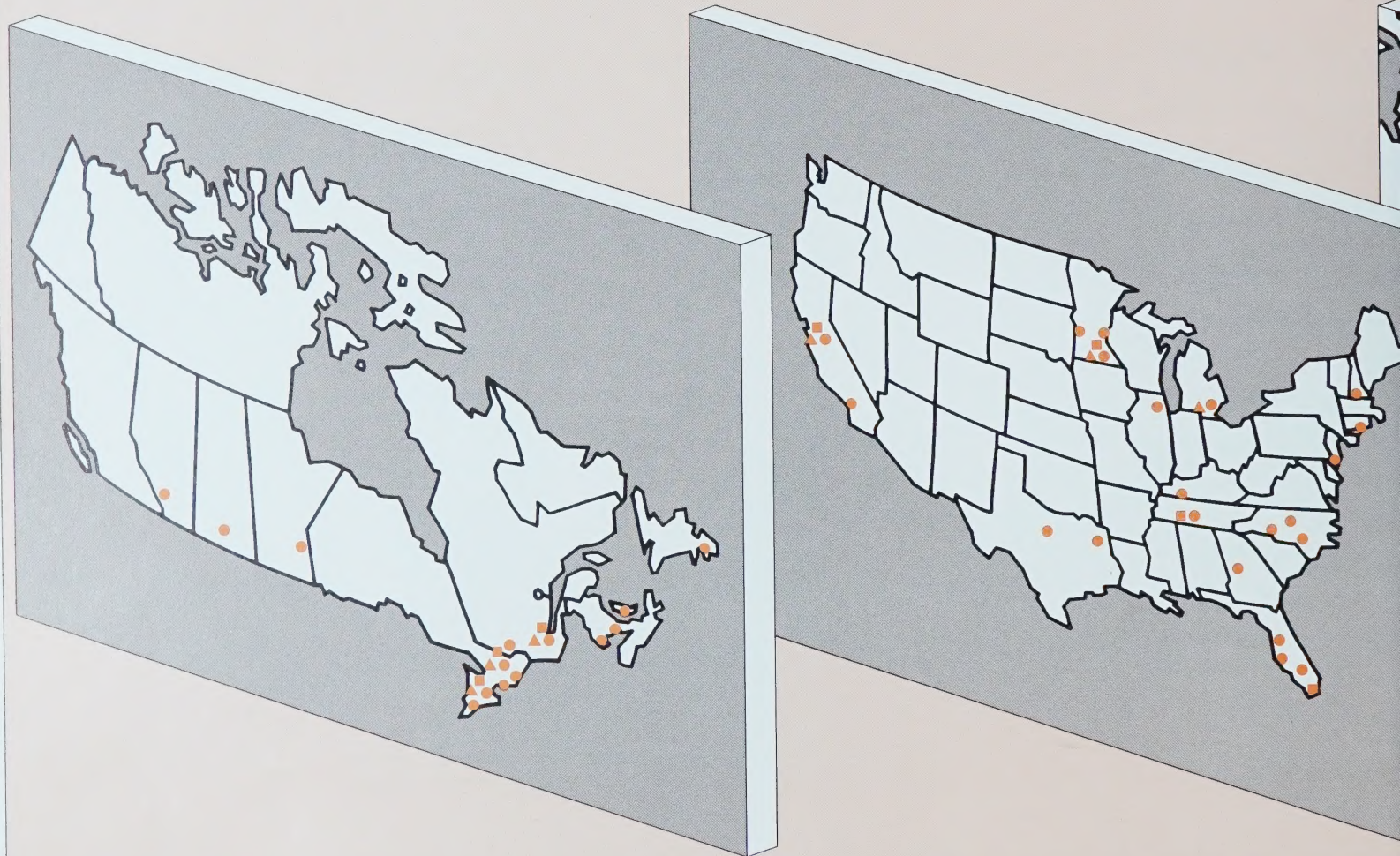
C. Trent Riley
Human resources

Robert L. Runge
Software

NORTHERN TELECOM AROUND THE WORLD

- Corporate headquarters
- Manufacturing facilities
- ▲ Research and development

- ★ Telecommunications and/or electronic office equipment sales companies



PRINCIPAL PRODUCTS



Business communications

- Packet switching systems
- Key telephone systems
- Electronic and digital PABX systems
- Private and carrier network switching systems

Cable

- Power cables
- Telephone wires
- Composite coaxial cables
- Switchboard cables
- Paper-pulp and paper-ribbon insulated telephone cables
- Polyolefin insulated telephone cables
- Universal frame wires
- Fiber optic systems and components

Central office switching

- Step-by-step switching systems
- Crossbar switching systems
- Electronic switching systems
- Digital switching systems
- Traffic Operator Position Systems
- Centralized Automated Loop Reporting System
- Peripheral systems

Electronic office equipment

- On-line terminal systems
- Distributed data processing systems
- Intelligent terminals
- Remote batch terminal systems
- Multifunction terminal systems
- Printers and disk drives

Outside plant

- Customer premises distribution systems
- Terminals and closures
- Splicing connectors
- Miniature protector connectors
- Loading devices
- Protection devices
- Auxiliary tools and devices

Power equipment

- Power plants
- Ringing and tone equipment

Subscriber apparatus

- Rotary dial, push-button and key telephones
- Decorator telephones
- Coin telephones
- Handsfree units
- Repertory dialers
- Modular hardware
- Headsets

Test equipment

- Transmission test equipment
- Signaling and supervision test equipment
- Service observation test equipment
- Service analysis equipment
- PCM carrier test equipment
- Loop test equipment
- Trunk test equipment
- Data communications diagnostic test equipment
- Data communications patching and switching equipment

Transmission

- Analog and digital carrier systems
- Analog and digital multiplex systems
- Analog and digital microwave radio systems
- Voice frequency equipment and systems

MANUFACTURING FACILITIES

CANADA

Amherst, N.S.
Residential and business telephones and components

Amherst, N.S.
Telephone wire and cable

Aylmer, Que.
Digital subscriber carrier equipment, digital channel banks and repeaters, hybrid circuits and components

Belleville, Ont.
Electronic and digital PABXs, printed circuit boards, printed circuit packs, components, key telephone systems

Brampton, Ont.
Digital, electronic and electro-mechanical switching systems, parts and components, peripheral systems

Calgary, Alta.
Electronic switching equipment, cable forming

Calgary, Alta.
Telephone wire and cable

Calgary, Alta.
Repair and overhaul of telephone

Chatham, Ont.
Telephone fuses

Chatham, Ont.
Telephone systems

Chatham, Ont.
Telephone and switchboard cable, enamel wire

Chatham, Ont.
Communication wire and cable, power cable, building wire

LaSalle, Que.
Step-by-step switching systems, power equipment, connectors, multiple cables and relays

London, Ont.
Residential and business telephone sets, parts and components

Montreal, Que.
Sheet-metal and piece parts, machines, tools

Montreal North, Que.
Repair and overhaul of telephone sets, teletypewriters, switching and electronic equipment and data terminals. Calibration of instruments and manufacture of special assemblies

North York, Ont.
Repair and overhaul of telephone sets, teletypewriters, switching and electronic equipment and data terminals. Calibration of instruments and manufacture of special assemblies

Ottawa, Ont.
Custom large scale integrated circuits

Regina, Sask.
Telephone sets, buzzers, modular hardware

Regina, Sask.
Telephone wire and cable

Saint John, N.B.
Cables for PABXs, connector cables

Saint John, N.B.
Repair and overhaul of telephone sets and test sets

St. John's, Nfld.
Networks and sensors, keys, jacks, resistors

St. Laurent, Que.
Multiplex, voice frequency and radio equipment, printed circuit packs, device testing

St. Laurent, Que.
Customer premises distribution systems, terminals and closures, splicing connectors, miniature protector connector, loading devices, protection devices, auxiliary tools and devices

Winnipeg, Man.
Cable forming, digital transmission equipment

Winnipeg, Man.
Protection devices, central office protection connectors

UNITED STATES

Adelanto, Cal.
Repair and overhaul of telephone sets

Ann Arbor, Mich.
On-line terminal systems, distributed data processing systems, intelligent terminals, printers, disk drives, printed circuit boards

Atlanta, Ga.
Voice frequency, digital channel bank and subscriber carrier equipment

Creedmoor, N.C.
Digital switching systems

Concord, N.H.
Voice frequency and test equipment

Goldsboro, N.C.
On-line terminal systems, printed circuit boards

Kevill, Ky.
Repair and overhaul of telephone sets

Leesburg, Fla.
Repair and overhaul of telephone sets

Minnetonka, Minn.
Disk drives

Minnetonka, Minn.
On-line terminal systems, remote batch terminal systems, multi-function terminal systems

Montevideo, Minn.
Printed circuit boards

Moorestown, N.J.
Data communications diagnostic test equipment, data communications patching and switching equipment

Morrisville, N.C.
Printed circuit packs

Morton Grove, Ill.
Outside plant equipment, toll data collection systems, loop treatment and voice frequency equipment, tape transports

Nashville, Tenn.
Telephone sets

Richardson, Texas
Computerized telecommunications switching for networks and PABX

Sanford, N.C.
Repair and overhaul of telephone sets

Santa Clara, Cal.
Electronic and digital PABXs

St. Paul, Minn.
Sheet metal fabrication

Tampa, Fla.
Repair and overhaul of telephone sets

Texarkana, Tex.
Repair and overhaul of telephone sets

Warwick, R.I.
Printers

West Palm Beach, Fla.
Printed circuit boards, printed circuit packs, hybrid circuits

BRAZIL

Rio de Janeiro
Outside plant equipment, protectors

GREAT BRITAIN

Hemel Hempstead
Card readers, cable assemblies, repair and refurbishment

MALAYSIA

Penang
Heat coils, cable forms, capacitors, telephone set components, fuses, transformers

REPUBLIC OF IRELAND

Ballincollig
Remote batch terminals, multifunction terminal systems

Galway
Telephone sets, PABX systems, voice frequency equipment

TURKEY

Istanbul
Electro-mechanical switching systems, switchboards, telephone apparatus

AT THE HEART OF INNOVATION

The heart of industrial innovation is research and development. R&D provides vitality to the ongoing process of identification, design and production of products and services to meet the needs of the marketplace.

Customer needs in the telecommunications and electronics industries are quickly changing. Competition to satisfy these needs is strong and increasing. Research and development teams design products and services identified by marketing groups as being in immediate and long-term demand. In close



LSI development is carried out at BNR's silicon laboratory at Ottawa, Ontario.

consultation with manufacturing personnel, they help put on the market appropriate products at the right time and at the lowest possible cost. In a highly competitive business environment these products must be easy to ship, install, maintain and repair.

At Northern Telecom, one out of every nine employees is involved in either the original design and development of products and services or the improvement of manufacturing and service methods. Many of these 3,600 people are scientists, engineers and highly skilled technicians working at the six central

research facilities in Canada and three R&D facilities in the United States. Others, such as administrative and clerical personnel, play an important role of support.

An increasing amount of product development work is carried out in the laboratories of manufacturing subsidiaries — 40 percent of our R&D in Canada is done at the divisional laboratories of Northern Telecom Canada. The rest of Northern Telecom's R&D is done by the staff of our research and development subsidiaries. The largest of these, Bell-Northern Research Ltd. (BNR), is the largest industrial R&D organization in Canada, and one of the most highly respected telecommunications research organizations in the world.

Designers at the main BNR laboratories in Ottawa, and the labs in Montreal and Toronto, played a major role in creating some of Northern Telecom's most successful products. Examples include the Contempra telephone, now used in 90 countries, and the SP-1 electronic switching system which became one of the most successful electronic switching systems in North America. The SP-1 has provided

about 15,000 man-years of employment in our manufacturing operations and almost 2,500 man-years of work in R&D.

BNR's most recent major contribution is to Northern Telecom's market-leading new DMS (Digital Multiplex System) line of switching and transmission systems and other digital products.

The first units of BNR-designed digital products shipped in 1978 include the DMS-200 large long-distance switching system shipped in April, the DMS-100 local switching system shipped

in December, and the DMS-300 international gateway switching center also shipped in December. Other Digital World products include the SL-1 business communications system, the DMS-1 subscriber carrier and remote switch, and the DMS-10 small central office switching system.

Although they support the innovative process mainly by providing designs for products identified by Northern Telecom's marketing organizations as being in immediate demand, BNR researchers also develop basic



Testing a DMS-10 transmission circuit pack at West Palm Beach, Florida.

Design and development of small business and residential communications systems are primary activities at BNR Inc. laboratories at Palo Alto, California.



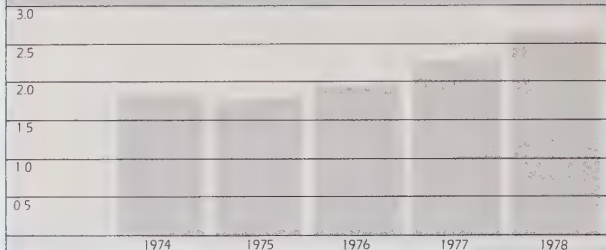
Software development for the SL-1 is done by BNR specialists at Ottawa, Ontario.

technology for use in future products. The optoelectronic systems currently marketed by Northern Telecom Canada are an example. The manufacturing plant of the optical systems division was put into operation in 1978, but research into fiber optics began at BNR in 1972.

Another example is COPES, a computer-based design system devised by BNR people and introduced in 1978. It helps designers arrange individual electronic components and LSIs on printed circuit boards. Since COPES helps

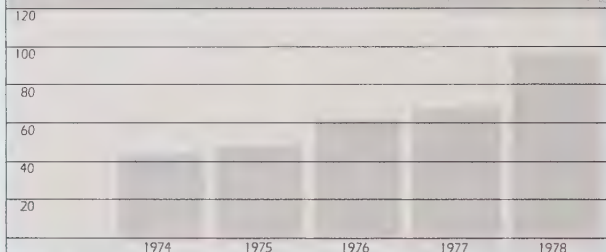
Number of employees, research subsidiaries

(thousands)



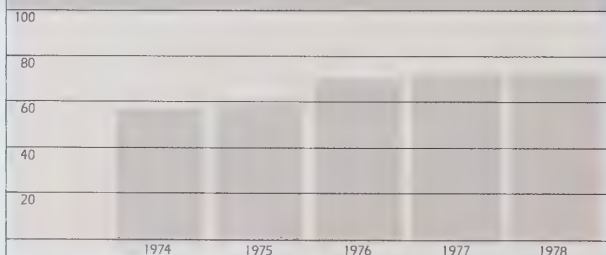
Research and development net expenditures

(\$ millions)



Proprietary products as percentage of manufacturing revenues

(percent)

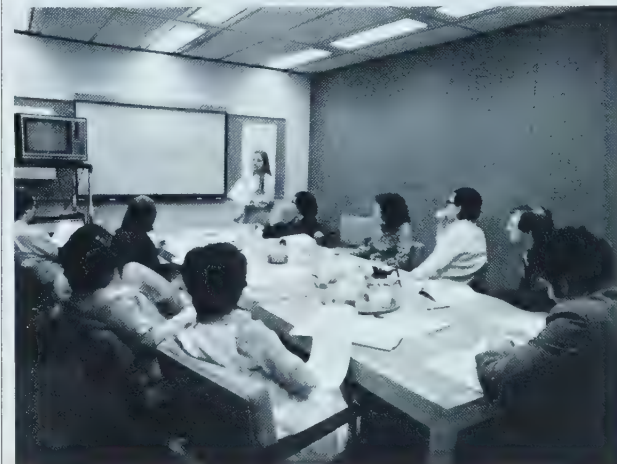


designers test the logical outcome of their work before a circuit board is actually built, their work is more efficient and will result in better and less-expensive products.

At BNR's United States subsidiary, BNR Inc. (BNRI), researchers have as their main responsibility the design and development of telecommunications systems and equipment for the U.S. market. The recently announced data-handling feature of the SL-1 digital business communications system, for instance, was

created mainly at BNRI laboratories in Palo Alto, California. BNRI teams also conduct research projects for outside companies and public organizations. At the end of 1978 BNRI had 244 employees.

In another Northern Telecom subsidiary, B-N Software Research Inc. (BNSR), many employees concentrate on the development of revenue-producing software information systems. Headquartered in Toronto, BNSR specializes in such endeavors as information-systems engineering



In-house training seminar at B-N Software Research, Toronto, Ontario.

and applied software research. Its employees are highly trained and experienced specialists devoted to finding innovative methods for information management. Some are engaged in software education and consulting. In 1978, for instance, a group of BNSR specialists began work on a contract with a computer manufacturer, Memorex, Inc. of California, to help design a software link between large computers which communicate through international protocols.

Although most of Northern Telecom's original design work is done by employees of R&D subsidiaries, most improvements to products already in the marketplace are made at the laboratories of our manufacturing subsidiaries. Personnel at these laboratories work with the Manufacturing Research Center in Ottawa to improve manufacturing methods throughout the Northern Telecom organization. In addition, Northern Telecom Systems Corporation, through Data 100 and Sycor — the two companies which form its nucleus — employs engineers and technicians at the engineering facilities in Minneapolis, Minnesota and Ann Arbor, Michigan to design and develop computer data terminal systems.



Computer specialists in Minneapolis, Minnesota develop the software for multifunction terminal systems.

Northern Telecom's investment in research and development in 1978 was almost \$98 million. This represents an increase over the previous year of more than 43 percent. It brings our investment in R&D over the last decade to almost \$468 million.

This substantial commitment of human and financial resources to research and development is critical in determining Northern Telecom's ability to compete. Since R&D is an investment in the



future of our entire corporation, it is guided and managed with skill and caution. We make a determined effort to be in constant touch with the needs and changes of the marketplace. The unique relationship with Bell Canada and Bell-Northern Research makes it possible for Northern Telecom to be a world leader in the satisfaction of a great variety of telecommunications needs. Our products are in use not only in Canada and the United States but also in almost 90 other countries.

With the confidence that this market sensitivity provides we move into the 1980s with war-

ranted optimism. We will spend more on R&D in 1979 than in any other year in our history — an expected \$135 million. By 1983 we expect to have invested more than \$270 million on research and development of digital products alone.

By continued support of market-sensitive research and development, and by involving all employees in bringing the innovative process to the marketplace, Northern Telecom will maintain the corporate vitality and technological leadership for which it is known today. ■

Development and production of the DMS-100/200 are carried out at Brampton, Ontario.

BEATING THE ODDS IN CANADA, OVERSEAS

An individual shows his true worth when faced with challenge or adversity. A business enterprise, in the same way, demonstrates creativity, strength, and stamina when confronted by a challenging environment. Northern Telecom Canada (NTC) and Northern Telecom International (NTIL), the two operating subsidiaries based in Canada, both overcame some difficult problems in 1978 and ended the year with success.

Northern Telecom Canada successfully defended its share of



Digital products, such as the DMS-1 manufactured at Aylmer, Quebec, require careful checking during all phases of production.

the Canadian telecommunications market in 1978 despite adverse business conditions throughout the year.

Social, economic and political factors contributed in 1978 to a near stagnation of the Canadian economy. Telephone company expenditures for telecommunications equipment did not keep pace with inflation. Competition from domestic and foreign manufacturers was intense. In spite of this, NTC sold almost \$890 million of goods and services in 1978. About 11.5 percent of its sales were exported.

Some of the year's highlights:

- The first commercial DMS-200 digital long-distance switching system was shipped in April, a year ahead of the public commitment made in 1976.
- The first DMS-100 digital local switching system was shipped on schedule in December, 1978.
- The first DMS-300 international gateway digital switching system was also shipped in December, although first scheduled for 1980.

■ Sales and orders of the SL-1 digital business communications system exceeded 300 units at the end of 1978. Of these, almost 60 units were shipped overseas.

■ Peripheral Systems Division, in its third year of operation, reported record sales of \$19 million.

■ 183 DMS-1 digital carrier systems were in service by year-end.

■ 500 positions of TOPS (Traffic Operator Positions System) were manufactured during 1978.

■ By year-end, six installations of CALRS (Central Automated Loop Reporting System) had been put into service.

■ The Optical Systems Division, established in 1977, began production at its pilot manufacturing plant.

■ Northern Telecom's electronic telephone, called e-Phone, completed field trials in 1978 and was introduced to the market by the Station Apparatus Division.

■ The Outside Plant Division began shipping the new Miniature Protector Connector (MPC), a miniaturized terminating and protection device, to Canadian, U.S. and overseas customers.

A major reason for NTC's success is that in 1978 it was once again a Canadian leader in pro-

ductivity improvement. This kept average price increases at less than five percent — well below the national inflation rate of 8.4 percent.

Individual efforts from NTC's 14,900 employees also contributed significantly to NTC's success. Some contributions were recognized directly in the form of monetary awards. NTC employees received a total of more than \$300,000 for money-saving ideas which cut production and administrative costs by almost \$2 million.



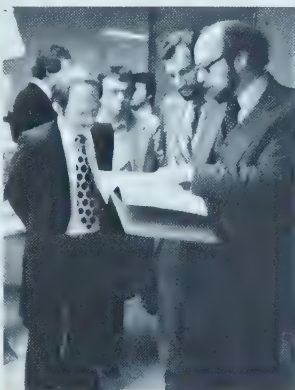
Emile Paquette (right), a suggestion-award winner of \$38,400, explains his money-saving idea at Lachine, Quebec, to B.A. Beneteau, president, Northern Telecom Canada Limited.

The low level of lost-time accidents at NTC's 25 manufacturing plants further contributed to the company's competitive position. The plant in Belleville, Ontario set what is believed to be a provincial — and possibly North American — record. In November, 1978, it passed the four million mark in hours worked without a lost-time accident. Employees at Kingston, Ontario and Amherst, Nova Scotia each worked more than one million hours without a lost-time accident. Other plants achieved similar successes.

The spirit of efficiency and innovation nurtured at NTC has been carried to other Northern Telecom subsidiaries.

Sales by Northern Telecom International in Europe, Asia, Latin America, the Caribbean and other regions outside of North America were about \$60 million in 1978. These sales accounted for 1,600 manufacturing jobs or nearly 11 percent of the Northern Telecom Canada workforce.

NTIL's primary objective is to export profitably Northern Telecom products, services and technology from Canada and the United States. However, to protect their national economic



Delegates from the Deutsche Bundespost (West Germany's telecommunications authority) visited Datapac facilities at Bell Canada, Ottawa. Last year, Northern Telecom's first international sale of the SL-10 was to the Bundespost, for a data packet switching network for use in Berlin.

interests, many countries prefer joint ventures with North American manufacturers, the establishment of local manufacturing plants, or licences to domestically produce equipment designed elsewhere.

In deciding which of the alternatives to recommend and pursue in a given country, Northern Telecom International weighs

such factors as political stability, local attitudes towards foreign companies, the country's balance of payments position, its ability to live up to financial obligations, its business methods, the state of development of its national and local telecommunications network, and its ability to absorb new technology.

One of NTIL's significant achievements in 1978 was the first international sale of Northern Telecom's SL-10 packet switching system. The SL-10 is the backbone of the Datapac network operated by the TransCanada Telephone System. The Deutsche Bundespost, West Germany's telecommunications authority, will use the SL-10 in its data network in Berlin. Another SL-10 was sold in Belgium where it will be used in a private data network for a large banking system. Equally important in breaking new ground is the introduction of DMS digital switching systems to the Caribbean region. By the end of 1978 Barbados Telephone had ordered or installed four DMS-1s, three DMS-10s and a DMS-100. The Bahamas ordered a DMS-10 and Jamaica cut over its first DMS-1.

The largest SL-1 digital business communications system ever produced, with an initial capacity of 3,000 lines, was shipped in 1978 to Saudia Arabia for installation at the Jeddah seaport. By year-end 1978 NTIL had sold or had firm commitments for 75 SL-1 systems in 16 countries.



The Contempra telephone, now in use in 90 countries, is produced in Galway, Republic of Ireland, for the European market.

Employees at Belleville, Ontario, proudly celebrate four million accident-free man-hours.

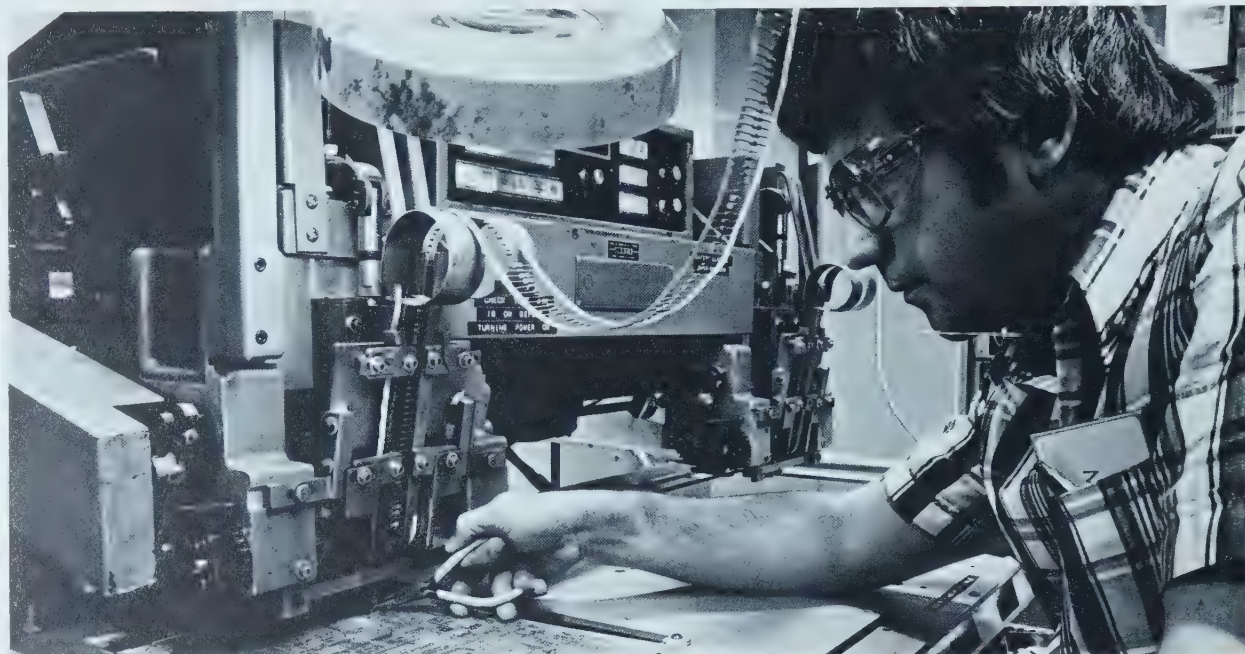


Sales of the Contempra telephone set — already in use in some 90 countries — continued at a high level in 1978, especially in Europe and Asia.

Production output at the NETAS — Northern Electric Telekomünikasyon A.S. plant in Istanbul, Turkey continues to increase. This subsidiary sold some



Electro-mechanical switching systems and telephone apparatus are produced at the Istanbul, Turkey plant.



Working with an automatic insertion machine at the Winnipeg, Manitoba transmission plant.

\$45 million of telecommunications equipment to the Turkish government in 1978. It was built by Northern Telecom in 1967 as a joint venture with the Turkish government. It now employs 1,800 of whom only nine are Canadians.

In 1979 NTIL will add to the portfolio of its manufacturing subsidiary, Northern Telecom (Ireland), at Galway, Eire. The plant assembles telephones and SL-1s for European and Middle

East markets. It employs almost 150 people most of whom, including the new plant manager appointed in 1978, Patrick J. Hogan, are Irish citizens.

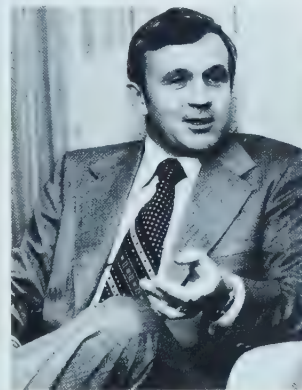
Ho Boon Theam, the new managing director of our manufacturing operations in Penang, Malaysia, which employs 300, was appointed early in 1979. He, too, was recruited and trained locally.

NTIL expects to increase its sales by more than 40 percent in 1979. Responsive service centers such as those being established in England, Ireland and Singapore will help ensure sales increases in the future.

NTIL personnel are negotiating several new international agreements. Some will be announced in 1979. Besides supplying countries outside North America with some of the best telecommunications technology in the world, NTIL provides work for Northern Telecom employees back home, and helps support out intensive research and development programs in Canada and the United States. In this way Northern Telecom International contributes to the success and prosperity of Northern Telecom Canada and other segments of the Northern Telecom family. ■

IN THE U.S. THE BEAT GOES ON

Northern Telecom's penetration of the world's largest single market for telecommunications and electronic office equipment increased substantially in 1978. More than 32 percent of our total manufacturing sales were in the United States. About 27.5 percent of sales of Northern Telecom telecommunications equipment were to U.S. customers, compared with 18.9 percent the year before.



Leonard N. Mackenzie, president and chief executive officer, Northern Telecom Systems Corporation.

Our vigorous thrust into the U.S. market caused a corresponding growth in the size and scope of our U.S. operations. At year-end 1978, Northern Telecom's U.S. subsidiaries employed 12,900 people and operated 27 manufacturing plants. Acquisitions completed in 1978 account for almost 8,000 employees and 12 plants.

Our growth in 1978 was accompanied by organization changes and the introduction of new products and production methods. It provided new opportunities for managers and employees.

We have become one of the largest suppliers of telecommunications equipment and a leading manufacturer of digital switching systems in the U.S. by implementing a strategy which includes:

- the manufacturing and servicing of equipment at locations which are best suited to meet customer needs;
- acquisition of established, successful companies which have a strong customer base, open new markets or add to Northern Telecom's marketing or technical expertise;

■ export of components, products and technology from plants and laboratories in Canada.

Northern Telecom, Inc. (NTI), our telecommunications subsidiary in the U.S., increased sales by 52 percent in 1978. The co-operation of management and employees in the successful marketing of new telecommunications products is a major reason for NTI's growth. Specifically, in 1978, NTI:

- had sold, on order, or firm commitments for 186 DMS-10s by year-end. The DMS-10 is a digital local switching system introduced in 1977 and produced in Creedmoor, North Carolina. It is the best-selling digital switch in the U.S. market.
- booked sales and orders for more than 480 units of the SL-1 digital business communications system introduced in 1975. U.S. production of the SL-1 is in Mountain View, California.
- increased sales of Danray private network switching systems by 100 percent over the year before. Danray is headquartered in Richardson (near Dallas), Texas. Its acquisition by NTI was completed in 1978.
- acquired Eastern Data Industries and its principal subsidiary, Spectron, Inc., a manufacturer of equipment used to test and



Data 100's multifunction terminal systems, manufactured in Minneapolis, Minnesota, are shipped world-wide.

monitor the quality of data transmission. Spectron, together with Northeast Electronics division, headquartered in Concord, New Hampshire, clearly establishes NTI as one of North America's leading producers of telecommunications test equipment.

- increased sales of outside plant equipment and telephone

set repair service by 23 percent, through its Chicago-based Cook Electric division.

- introduced an electronic version of the Contempra telephone set and added two new models to the Imagination line of telephones produced at Nashville, Tennessee.

■ reorganized its business communications group by establishing a new marketing division in Richardson, Texas. The new division markets the SL-1, Danray's Computerized Branch Exchange (CBX) and other private network switching systems. The NTI systems division previously headquartered in Memphis, Tennessee became part of the new marketing division.

■ integrated the electronics plant at West Palm Beach, Florida into the digital switching division, headquartered in Creedmoor, North Carolina, to increase efficiency and responsiveness to customer demand



Part of NTI's success is due to its support by BNR, Inc., the R&D subsidiary headquartered in Palo Alto, California. The new data feature of the SL-1 digital business communications system,

announced by NTI early in 1979, for instance, was designed by BNR, Inc. The feature enables SL-1 telephone sets to handle voice and data simultaneously.

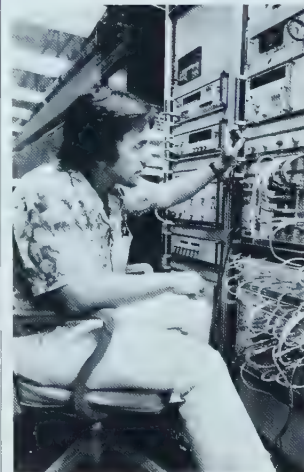
Northern Telecom's forceful drive into the U.S. telecommunications market was paralleled in 1978 by our entry into the closely related electronic office systems market. We moved into this rapidly growing field by forming a new company, Northern Telecom Systems Corporation (NTSC), headquartered in Minnetonka (near Minneapolis), Minnesota. Two companies acquired in 1978, Sycor, Inc. and Data 100 Corporation, form the nucleus of NTSC. Sycor and Data

100 design, market and manufacture terminal systems which enter and retrieve data from central, or mainframe, computers.

Sycor was acquired in May, 1978. It has 41 sales offices and 111 service centers in North America. At its main manufacturing plant in Ann Arbor, Michigan and another in Goldsboro, North Carolina, Sycor produces stand-alone and clustered intelligent terminal systems and related peripheral equipment for distributed data processing. One of its most sophisticated terminals systems, the Model 445, has a central processing unit and up to eight individual work stations which concurrently and independently perform tasks such as data entry, data communications and data processing. More than 50,000 Sycor terminals are in use around the world.

Sycor produces Intelligent clustered terminals in Ann Arbor, Michigan.

Data 100 designs and manufactures multifunction terminal systems which do much of the work previously done only by mainframe computers. The Model 85 remote information system introduced in 1978, for example, maintains local infor-



DMS-10, the largest selling digital switch outside of the Bell system, is produced at Northern Telecom, Inc.'s Creedmoor, North Carolina plant.

Cook Electric of Morton Grove, Illinois, is a leading designer and supplier of outside plant products in the United States.



mation files in addition to transmitting and receiving information from a central computer. It is used for payroll, inventory control, production control and other tasks usually done by main-frames.

Data 100's main manufacturing and R&D facilities are in Minnetonka, Minnesota. It has four other manufacturing plants in the U.S., one in England and one in the Republic of Ireland. The company has 13 international subsidiaries, 17 distributorships and 86 sales and engineering offices in Europe, North America, Australia and South Africa. Data 100 was acquired in November, 1978.

At year-end 1978, NTSC employed 6,500 people of whom some 550 are engineers, software designers and other specialists in data processing and computers. About 1,300 NTSC employees work outside the U.S. They market and service about 30 percent of the more than 60,000 terminal systems bought or leased by customers in 50 countries.

The integration of Sycor and Data 100 into the Northern Telecom group of companies began in the latter part of 1978. John C. Lobb, formerly chair-

man of NTI and NTL, was appointed NTSC's first chairman. He retired from the company in April 1979. Leonard N. Mackenzie who joined us in 1978 from TRW Systems and Services at Los Angeles, California, where he was vice-president and general manager, became NTSC's president and chief executive officer. Other senior appointments were announced in December 1978 and early 1979.

Northern Telecom's penetration of U.S. markets continues to accelerate. Its U.S. managers and employees share the task of building and maintaining its reputation as one of the world's leading manufacturers of technologically superior telecommunications equipment, electronic office equipment and, eventually, integrated communications systems for offices and homes of the future. ■

Meticulous printed circuit board work is performed on an assembly line at the Danray plant in Richardson, Texas.



MORE THAN A PLACE TO WORK

A modern corporation is more than a collection of offices and plants where people work and produce products for the marketplace. It is also an integral part of the communities in which its employees work and live



Northern Telecom supports and sponsors 16 symphony orchestras in North America.

One of the most important aspects of good community citizenship is participation in the community's many fund-raising activities for charitable and civic organizations. Northern Telecom is among the leaders in corporate financial support in the

communities where it has established plants and offices.

The community aspect of Northern Telecom's participation is basic to its contributions philosophy. Over the past five years Northern Telecom companies have contributed more than \$3 million to charitable organizations and groups in a broad range of activities.

More than 90 percent of our contributions budget is managed and spent locally. Our contributions program is determined by the Northern Telecom employees who live in the communities. The organizations we support are suggested by the local management of our plants and offices. Many employees participate in these local fund-raising activities in addition to the money they and the corporation donate.

The contributions programs are most active in the U.S. and Canada where more than 90 percent of our employees live and work, but there are smaller programs, for instance, in Hong Kong, Ireland and Malaysia which donate to charitable groups in those countries. There are additional programs under development in other countries. The corporation also responds to special needs and campaigns in other areas of the world.

For instance, in 1976, after a major earthquake struck Turkey, Northern Telecom donated \$15,000 to the Turkish Earthquake Relief Fund to help provide needed food, medical supplies, clothing and other goods and services to the victims of that tragedy.

Just over a third of all donated money has gone directly into the various united appeal campaigns in the U.S. and Canada. The remainder, about \$2 million, has gone to a wide range of health and welfare groups, hospitals, educational institutions, cultural organizations, environmental and conservation groups and special projects.

Northern Telecom participates in campaigns for the Heart Fund, Cancer Society, Big Brothers, Boys and Girls Clubs, Salvation Army, Institute for the Blind, Society for Crippled Children, and many other familiar health and welfare campaigns that may not be covered by the united appeals or which have their own campaigns. The corporation also gives to a broad range of local hospitals, health groups, rehabilitation centers for alcohol and drug abusers, and other needy groups on a project-by-project basis.

This year we began a new program for environmental and conservation projects. A number of projects in this area are being reviewed and we expect to spend more than \$100,000 over the next five years on specific groups engaged in studies and activities directed toward maintaining the healthiest possible environment and preserving our natural resources.

Just under half of the donations go to educational and cultural groups. In 1978 alone, Northern Telecom donated nearly \$170,000 to educational groups and institutions. These donations included a student aid program in Hong Kong, a number of research foundations and the local and national campaigns of Junior Achievement organizations in fourteen locations in North America.



Cook Electric's employees enthusiastically supported a special children's campaign, Toys for Tots, in cooperation with the U.S. Marine Corps.

WHERE WE CONTRIBUTED IN 1978

Local united appeals

Local cultural
organizations

Educational
institutions

Local health and
welfare agencies,
hospitals

National
campaigns:
health and
welfare,
environmental,
cultural and
others

More than 93 percent of our 1978
contributions supported local institutions
and organizations

Nine recipients of BNR's student science award toured the research laboratories in Ottawa last year.

One of the most interesting educational projects in which Northern Telecom is involved is its sponsorship, through Bell-Northern Research Ltd., of 10 science student awards for the Youth Science Foundation in Canada. BNR's financial support of this program goes to the 10 provincial finalists in engineering or related areas in science fair competition across the country.

These students at the high school or junior high school level are awarded token stipends and are given an all-expense three-day paid tour of BNR's facilities,

and the surrounding Ottawa area. Not only does the program do a great deal to stimulate science among youth but it gives some of the best young minds the opportunity to come in contact with our organization.

A number of these award-winning students have come to work in BNR's labs during the summer recess when they reached the university level. One university graduate who was a former Youth Science Foundation award winner, now works for BNR full-time.

By far the greatest proportion of educational funds — about \$125,000 in 1978 — goes directly to major universities. Recent recipients of donations from Northern Telecom include in Canada: the University of Toronto, McGill University in Montreal, Dalhousie University in Halifax, the University of British Columbia in Vancouver; in the U.S.: De Paul University and Northwestern University, both in Chicago; and in Ireland the University College Galway. In all, Northern Telecom has donated more than \$700,000 to 27 universities or degree granting colleges in the past five years.

The corporation is an active contributor to, and supporter of cultural activities. In 1978 Northern Telecom supported 18 symphonies or junior orchestras in North America. It provided support for an additional four opera

companies, six major ballet companies and more than two dozen theater groups ranging in size from the world-renowned Stratford (Shakespearean) Festival to a number of small, but respected, local theater groups in the communities where Northern Telecom's plants are located. The corporation also supports a number of major art galleries and museums in North America. In the past five years Northern Telecom contributed more than \$500,000 to cultural activities.

"The toughest part about running a contribution program is deciding which organizations to give to," says Roy T. Cottier, vice-president corporate relations and also chairman of the contributions committee for Northern Telecom Limited. "There are always more first-rate organizations worth supporting that we have funds to support."

More than 700 requests are received each year from registered charitable organizations seeking donations. Most of the solicita-

tions that the corporation receives come through the local plant locations and field offices. Every inquiry addressed to the corporation is reviewed and checked out. The final selection is a painstaking process as each request is examined on its own merits. Last year, more than 400 organizations received donations ranging in size from under \$100 to \$90,000.

In Canada, management at each location selects those organizations which they feel

best serve and represent the community. These requests are submitted to the corporate contributions committee which makes the final decisions on all donations across the country based on local recommendations and available funds. A similar approach is being examined for the U.S. At the present time, most subsidiaries there have their own contributions budget and contribute in the individual locations through these budgets. ■

Northern Telecom encourages and supports many significant youth activities, such as the Boy Scouts.

Northern Telecom gives financial support to several leading ballet companies, modern and traditional, in North America and overseas.



HOW WE DO BUSINESS

Since its beginning almost 100 years ago, Northern Telecom has conducted business in accordance with fundamental principles of good business. The principles are applied to all corporate policies and guidelines for employees. As the company grows, however, many new employees, customers, shareholders, suppliers and others in the communities and markets in which we operate do not know our business standards.

The Northern Telecom **Code of Business Conduct**, published in April, 1979, combines our business principles, policies and guidelines in a single publication. Another new publication, **How we do business**, is a short summary of the business standards contained in the **Code of Business Conduct**. These publications are intended to help employees in the day-to-day conduct of company affairs. They will also help those with whom we have regular business contact understand the principles underlying our dealings with them.

The business conduct of multinational corporations has been the concern in recent years of a number of government and international organizations. The Organization for Economic Cooperation and Development, for instance, in 1976 issued its

Guidelines for Multinational Enterprises. Our **Code of Business Conduct** is compatible with the OECD guidelines and in some cases goes beyond them. Although mindful of our primary purpose as a business enterprise, we also adhere to the reasonable demands for worldwide social responsibility voiced in recent discussions at the United Nations.

The Northern Telecom code is based on four fundamental principles of good business:

- Every business concern is accountable to its publics and has an obligation to keep them informed about its activities.
- Integrity is mandatory in all corporate relationships.
- It is unethical for employees to engage in conflicts of interest.
- Profit is essential to the continued existence of a business enterprise and to the well-being of everybody who depends on it.

The four fundamental principles form the basis of Northern Telecom policies and guidelines. Although an employee is expected to use his or her own good judgement, prudence and experience in each particular situation, the code contains specific guidelines and policies on relationships with our customers, competitors, suppliers, shareholders, governments, local communities and others.

Managers, professionals and supervisors at all Northern Telecom companies will receive copies of both publications: the complete **Code of Business Conduct** and the summary

version, **How we do business**. Each is published in English, French and Spanish editions. Copies for personal or external use are available at local personnel offices and

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Canada L5A 3A2 ■



THE DIGITAL WORLD IN AN INTELLIGENT UNIVERSE

The marketing of a new line of telecommunications equipment usually involves the cooperation of hundreds of employees, an investment of large amounts of money, and years of planning and coordination. In a highly competitive environment there is little room for misjudgement or failure. A telecommunications manufacturer must know precisely what current and potential customers are likely to need,

want and be able to afford. The timing, specification,

performance, serviceability and cost of new products must be accurately matched to evolving customer demand. To be successful, the telecommunications manufacturer must foresee long-term market trends and identify future opportunities.

The single most important influence on long-term telecommunications market trends in this decade and the 1980s is the coming together of telecommunications equipment and computers. Advances in electronic hardware and software technology and society's need to communicate greater volumes of information among larger numbers of people are the two main catalysts of this evolution.

Northern Telecom foresaw the confluence of computer and telecommunications technologies in the 1960s. We saw the trend as an opportunity and made the decision to become a world leader in the development and marketing of telecommunications equipment based on new technology. In the last 10 years we invested \$468 million on the research and development of new products, new

basic technology and new manufacturing methods.

The first concrete result of our commitment was the introduction in the early 1970s of a new line of electronic switching and transmission systems. Our SP-1 electronic central office switching system, the Pulse electronic private automatic branch exchange (EPABX) and other electronic products gained immediate and widespread market acceptance throughout North America. The SP-1 provided us with some 1,500 man-years of employment in R&D and 15,000 man-years of work in manufacturing.

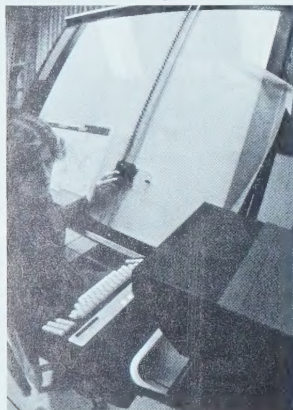
The second stage of our technological leadership began in the second half of the 1970s with the introduction of our family of digital switching systems. Digital transmission had been introduced earlier. The SL-1 business communications system, the DMS group of switching systems, and other digital products use integrated circuits and software. This technology is also used in computers.

The third and current stage represents our overall corpo-

rate thrust for the 1980s. It involves the market introduction of fully integrated communications systems for what we have called the Intelligent Universe. Offices and homes of the future will have integrated communications systems for voice, image and data. These will be linked by electronic switching and transmission systems such as the products in our Digital World

and the optoelectronic systems which we introduced in 1978.

The Intelligent Universe will make it possible for more and more people to create, have access to, and communicate vast amounts of information. Since Northern Telecom is one of the major contributors to making the Intelligent Universe a reality, we are confident that people will learn to use this new resource wisely and for the benefit of all. ■



Working with CALMA, a computer-aided design system, at Bell-Northern Research, Ottawa, Ontario.



Programming at Data 100's software development laboratory in Minneapolis, Minnesota.

Northern Telecom's long-term strategy to provide integrated electronic systems for homes, offices and telecommunications networks of the future is discussed in the corporation's annual report. **The Making of an Intelligent Universe** describes the gradual coming together of computer and telecommunications technologies and some of the social implications of this trend. It explains the way in which we have used technological innovation to satisfy evolving market demands and how Northern Telecom will continue to implement its strategy in the 1980s.

You can obtain a copy of the Northern Telecom 1978 Annual Report from your public relations department or by writing to:
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